

State the domain and the range for each of the following.
Show your work or give an explanation of each answer.

1. $y = |2x - 4| + 3$

$x: (-\infty, \infty)$
 $2x: (-\infty, \infty)$
 $2x - 4: (-\infty, \infty)$
 $|2x - 4|: [0, \infty)$
 $|2x - 4| + 3: [3, \infty)$

$D: (-\infty, \infty)$
 $R: [3, \infty)$

2. $x = -4|y + 2| - 7$

$y: (-\infty, \infty)$
 $y + 2: (-\infty, \infty)$
 $|y + 2|: [0, \infty)$
 $-4|y + 2|: (-\infty, 0]$
 $-4|y + 2| - 7: (-\infty, -7]$

$R: (-\infty, \infty)$
 $D: (-\infty, -7]$

3. $x = y^2 - 3$

$y: (-\infty, \infty)$
 $y^2: [0, \infty)$
 $y^2 - 3: [-3, \infty)$

$R: (-\infty, \infty)$
 $D: [-3, \infty)$

4. $y = -(x - 1)^2 + 5$

$x: (-\infty, \infty)$
 $x - 1: (-\infty, \infty)$
 $(x - 1)^2: [0, \infty)$
 $-(x - 1)^2: (-\infty, 0]$
 $-(x - 1)^2 + 5: (-\infty, 5]$

$D: (-\infty, \infty)$
 $R: (-\infty, 5]$

5. $y = 2\sqrt{x - 6} + 3$

$x - 6 \geq 0$
 $x \geq 6$

$x: [6, \infty)$
 $x - 6: [0, \infty)$
 $\sqrt{x - 6}: [0, \infty)$
 $2\sqrt{x - 6}: [0, \infty)$
 $2\sqrt{x - 6} + 3: [3, \infty)$

$D: [6, \infty)$
 $R: [3, \infty)$

6. $x = -\sqrt{5y + 2}$

$y: [-\frac{2}{5}, \infty)$
 $5y: [-2, \infty)$
 $5y + 2: [0, \infty)$
 $\sqrt{5y + 2}: [0, \infty)$
 $-\sqrt{5y + 2}: (-\infty, 0]$

$5y + 2 \geq 0$
 $5y \geq -2$
 $y \geq -\frac{2}{5}$

$R: [-\frac{2}{5}, \infty)$
 $D: (-\infty, 0]$

7. $y = \sqrt[3]{4 - 5x}$

$x: (-\infty, \infty)$
 $5x: (-\infty, \infty)$
 $4 - 5x: (-\infty, \infty)$
 $\sqrt[3]{4 - 5x}: (-\infty, \infty)$

$D: (-\infty, \infty)$
 $R: (-\infty, \infty)$

8. $y = \frac{4}{6 - x}$

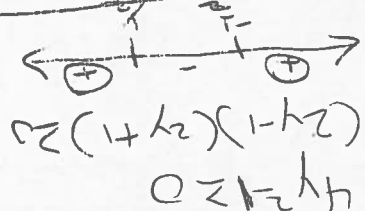
$x: (-\infty, 6) \cup (6, \infty)$
 $-x: (-\infty, -6) \cup (-6, \infty)$
 $6 - x: (-\infty, 0) \cup (0, \infty)$
 $\frac{1}{6 - x}: (-\infty, 0) \cup (0, \infty)$
 $\frac{4}{6 - x}: (-\infty, 0) \cup (0, \infty)$

$6 - x \neq 0$
 $x \neq 6$

$D: (-\infty, 6) \cup (6, \infty)$
 $R: (-\infty, 0) \cup (0, \infty)$

11. $x = -\sqrt{4y^2 - 1}$

$y_0: (-\infty, -\frac{1}{2}] \cup [\frac{1}{2}, \infty)$
 $y_2: [\frac{1}{2}, \infty)$
 $y_2: [1, \infty)$
 $y_2 - 1: [0, \infty)$
 $\sqrt{4y^2 - 1}: [0, \infty)$
 $\sqrt{4y^2 - 1}: (-\infty, 0]$

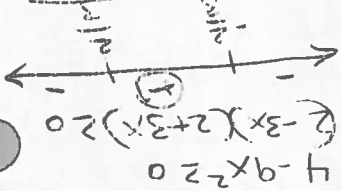


$D: (-\infty, 0]$
 $R: (-\infty, -\frac{1}{2}] \cup [\frac{1}{2}, \infty)$

12. $y = \sqrt{4 - 9x^2}$

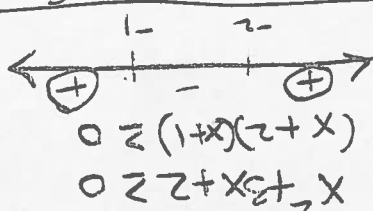
$X: [-\frac{2}{3}, \frac{2}{3}]$
 $X^2: [0, \frac{4}{9}]$
 $9x^2: [0, 4]$
 $-9x^2: [-4, 0]$
 $4 + 9x^2: [0, 4]$
 $\sqrt{4 - 9x^2}: [0, 2]$

$D: [-\frac{2}{3}, \frac{2}{3}]$
 $R: [0, 2]$



9. $y = \sqrt{x^2 + 3x + 2}$

$x: (-\infty, -2] \cup [-1, \infty)$
 $x + \frac{3}{2}: (-\infty, -\frac{1}{2}] \cup [\frac{1}{2}, \infty)$
 $x + \frac{3}{2}: [\frac{1}{2}, \infty)$
 $(x + \frac{3}{2})^2: [\frac{1}{4}, \infty)$
 $\sqrt{(x + \frac{3}{2})^2}: [\frac{1}{4}, \infty)$



$D: (-\infty, -2] \cup [-1, \infty)$
 $R: [0, \infty)$

10. $y = \sqrt{-(x^2 + 3x + 2)}$

$X: [-2, -1]$
 $X + \frac{3}{2}: [-\frac{1}{2}, \frac{1}{2}]$
 $(X + \frac{3}{2})^2: [0, \frac{1}{4}]$
 $-(X + \frac{3}{2})^2: [-\frac{1}{4}, 0]$
 $\sqrt{-(X + \frac{3}{2})^2}: [-\frac{1}{4}, 0]$
 $\sqrt{-(x^2 + 3x + 2)}: [-\frac{1}{4}, 0]$

$D: [-2, -1]$
 $R: [0, \frac{1}{4}]$

$-(x^2 + 3x + 2) \geq 0$
 $(x^2 + 3x + 2) \leq 0$
 $(x + 2)(x + 1) \leq 0$